

In the Claims

1 1. (Previously Presented) A method of cooling a low Z target material of a neutron source
2 assembly, comprising:

3 providing, by using a nozzle, a submerged jet of concentrated liquid gallium in a direction
4 normal to a non-bombarded surface of the low Z target material within the neutron source assembly
5 to cool the low Z target material;

6 providing a reservoir of liquid gallium; and

7 pumping the liquid gallium, serially, from the reservoir, through the nozzle, such that the
8 liquid gallium impinges upon the low Z target material in the neutron source assembly and cools the
9 target material, from the neutron source assembly directly to a heat exchanger to remove heat from
10 the liquid gallium, and from the heat exchanger to the reservoir.

1 **Claims 2-3 (Cancelled)**

1 4. (Previously Presented) The method of claim 1, wherein the target material comprises
2 beryllium.

1 5. (Previously Presented) A neutron source assembly having a liquid cooled target,
2 comprising:

3 an accelerator based neutron source including a low Z target material that is bombarded by
4 accelerated particles to produce a neutron flux; and

5 a cooling system to circulate liquid gallium through said accelerator based neutron source to
6 cool the low Z target material;

7 said cooling system including a nozzle, said nozzle providing a submerged jet of
8 concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target
9 material within the accelerator based neutron source;

10 said cooling system further including,

11 a reservoir of liquid gallium;

12 a heat exchanger, and

13 means for serially circulating said liquid gallium from said reservoir through
14 said nozzle to impinge upon said surface of the low Z target material within said

15 accelerator based neutron source, from said accelerator based neutron source directly
16 to said heat exchanger, and from said heat exchanger to said reservoir.

1 **Claim 6 (Cancelled)**

1 7. (Previously Presented) The neutron source assembly of claim 5, wherein said means for
2 circulating comprises a pump.

1 8. (Previously Presented) A liquid cooling system for a neutron source assembly, said
2 cooling system comprising:

3 a reservoir of liquid gallium;

4 a heat exchanger;

5 a nozzle, said nozzle providing a submerged jet of concentrated liquid gallium in a direction
6 normal to a non-bombarded surface of a low Z target material within the neutron source assembly;
7 and

8 means for serially circulating said liquid gallium from said reservoir through said nozzle to
9 impinge upon said surface of the low Z target material within the neutron source assembly, from the
10 neutron source assembly directly to said heat exchanger, and from said heat exchanger to said
11 reservoir.